

RESPONSE TO OFFICE ACTION
Serial No. 09/957,395
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1. (Currently Amended) A method of making an optical waveguide, in a substrate material comprising
providing a substrate comprising a semiconductor layer disposed on a first insulating layer;
[[a]] forming an opening in said substrate, through said semiconductor layer to said first insulating layer;
b) depositing a first cladding layer conformally in said opening,
[[c]] filling said opening with a core material;
[[d]] removing excess core material[[.]]; and
[[e]] depositing a second top cladding layer over the substrate core material.
2. (Currently Amended) A method according to claim 1 wherein said substrate is semiconductor layer comprises at least one material selected from the group consisting of silicon, silicon-germanium, gallium arsenide, indium gallium arsenide and indium phosphide.
3. (Currently Amended) A method according to claim [[2]] 1 wherein said substrate semiconductor layer is silicon.
4. (Currently Amended) A method according to claim 3 wherein said first insulating layer and said first and second cladding layers top cladding layer are of silicon oxide, each layer having a different refractive index.
5. (Original) A method according to claim 1 wherein excess core material is removed by chemical mechanical polishing.

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6. (Currently Amended) A method of making an optical waveguide, ~~in a silicon-containing substrate having a layer of silicon nitride and a layer of silicon oxide thereon~~ comprising:

providing a substrate comprising a semiconductor layer disposed on a first insulating layer;

depositing a silicon oxide layer over a silicon nitride layer on said semiconductor layer;

depositing a masking layer on said silicon oxide layer;

[[a]] masking and patterning an opening in said mask masking layer; [[.]]

[[b]] etching through the silicon oxide and silicon nitride layers to form a hard mask; [[.]]

[[c]] etching an opening in said substrate semiconductor layer to the first insulating layer; [[.]]

~~d) conformally depositing a first cladding layer of silicon oxide in said opening,~~

~~[[e]] filling said opening with a core material having a different refractive index than said first cladding layer;~~

~~[[f]] planarizing the core and first cladding layer to remove said silicon oxide layer; [[.]]~~

~~[[g]] etching said silicon nitride layer; [[.]] and~~

~~[[h]] depositing a second top cladding layer having a different refractive index than the core material and the first cladding layer.~~

7. (Currently Amended) A method according to claim 6 wherein said substrate semiconductor layer is silicon.

8. (Currently Amended) A method according to claim 6 wherein said substrate is silicon on insulator further comprises a second insulating layer having the first insulating layer disposed thereon.

9. (New) A method according to claim 1 further comprising:

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a second insulating layer having the first insulating layer disposed thereon.

10. (New) A method according to claim 9, wherein the second insulating layer and the first insulating layer are comprised of the same material.

11. (New) A method according to claim 9, wherein the second insulating layer is comprised of glass.

12. (New) A method according to claim 9, wherein the second insulating layer is comprised of silicon oxide.

13. (New) A method according to claim 1 further comprising:

a bottom cladding layer disposed in the opening and having a refractive index different than the top cladding layer.

14. (New) A method according to claim 1, wherein the bottom cladding layer is comprised of glass.

15. (New) A method according to claim 9, wherein the core material forms an optical waveguide cladded by the first insulating layer and the top cladding layer.

16. (New) A method according to claim 6 further comprising:

conformally depositing a bottom cladding layer in said opening having a different refractive index than said core material.

17. (New) A method according to claim 16, wherein the bottom cladding layer is silicon oxide.

18. (New) A method according to claim 16, wherein the step of planarizing further comprises:

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removing a portion of the bottom cladding layer.

19. (New) A method according to claim 6, wherein the first insulating layer is comprised of at least one of glass or silicon oxide.

20. (New) A method according to claim 6 further comprising:
a second insulating layer having the first insulating layer disposed thereon.

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